Amendment to claims:

1-65 (canceled)

66 (currently amended): A system for operating a spiral wound membrane element that includes back-flushing, which system comprises:

a feed tank holding a volume of feed solution;

a spiral wound membrane element having a permeate carrier sheet, a feed spacer sheet, and a membrane filter layer sheet, which element is aligned generally vertically within said feed tank,

means confining said spiral wound membrane to a generally cylindrical configuration with said element being open to axial flow at both ends thereof;

a vacuum system in fluid connection with said permeate carrier sheet within said element for applying vacuum thereto to create driving pressure needed to cause the feed solution in the feed spacer sheet of the element to flow through the membrane sheet and thereby create liquid permeate flow in the carrier sheet and flow of feed solution upward into said element; and

means for periodically applying pressurized back-flush fluid to said permeate carrier sheet to back-flush the element by creating flow from within said permeate carrier sheet through said membrane sheet and into said feed spacer sheet.

67 (currently amended): The system of claim 66 wherein said spiral wound element is aligned vertically within said feed tank and wherein a bubbler is disposed vertically below said element for creating bubbles which rise and promote convective flow of feed solution into the lower end ~~through~~ of the element and out of the upper end, said bubbles acting as turbulence promoters at the surface of the membrane filter layer sheet for reducing the boundary layer at the surface of the membrane filter layer sheet.

68 (previously presented): The system of claim 67 further comprising:

an air pump for compressing gas for the bubbler;

a permeate accumulator connected to a permeate conduit in fluid connection with said permeate carrier sheet in said element, and

a permeate diverter valve connected to an outlet from said accumulator, through which valve said vacuum system is connected.

69 (previously presented): The system of claim 68 wherein said back-flush fluid-applying means is designed to apply some permeate from said accumulator under pressure to said element.

70 (currently amended): The system of claim 69 wherein a source of compressed air is ~~produced~~ provided which is connected to said accumulator through said diverter valve to pressurize said permeate for back-flush flow of permeate and air back to said element.

71 (previously presented): A method of operating a spiral wound membrane element which includes periodic back-flushing, which method comprises:

placing a spiral wound membrane element, having a feed spacer sheet, a membrane filter layer sheet and a permeate carrier sheet, generally vertically in a tank containing an aqueous feed solution, said element being confined to a generally cylindrical configuration and being open to inflow at a lower end and open to outflow at an upper end thereof;

creating a pressure differential between the permeate carrier sheet in said element and the feed solution within the tank so that water passes through the membrane sheet into the permeate carrier;

introducing on a periodic basis a pressurized back-flush fluid into the permeate carrier sheet of the element to cause reverse flow through said membrane sheet into said feed spacer sheet to dislodge feed solution solids being retained on the membrane filter layer sheet; and

providing bubbles below the open lower end of the element which rise upward and flow through the element so as to create a convective flow of the feed solution into the open lower end of the element and out the open upper end and to promote turbulence at a surface of the membrane filter layer sheet to reduce a boundary layer at the surface of the membrane filter layer sheet, said bubbling rising flow causing feed solution within the element and permeate flowing in reverse through the membrane sheet to exit from the open upper end and carry with it dislodged solids.

72 (previously presented): The method of claim 71 wherein said pressure differential is provided by applying vacuum to the permeate carrier sheet, which method further comprises:

accumulating some of the aqueous permeate in a permeate accumulator through which said vacuum is being applied; and

periodically pressurizing permeate in the permeate accumulator and causing it to flow back into the element and in reverse flow through the membrane sheet to back-flush the feed solution solids from the surface of the membrane filter layer sheet.

73 (previously presented): The method of claim 72 wherein gas pressure is applied to the permeate in the accumulator to provide the back-flush pressure and wherein, following back-flushing by the permeate in the accumulator, gas pressure alone is used to further back-flush the element.

74 - 83 (canceled)

84 (new): The system of claim 66 wherein a bubbler is disposed vertically below the lower end of said element for creating bubbles which rise and promote convective flow of feed solution into the element and out of the upper end, to promote turbulence at the surface of the membrane filter layer sheet and reduce the boundary layer.

85 (new): The system of claim 66 wherein said feed tank is filled with a volume of feed solution such that said element is completely submerged in said feed solution.

86 (new): The system of claim 67 wherein a permeate conduit is in fluid connection with said permeate carrier sheet in said element and exits through the open top of said tank.

87 (new): The method of claim 71 wherein the pressure of the back-flush fluid applied to the element is between about 5 and 100 psi.

88 (new): The method of claim 87 wherein the pressure of the back-flush fluid applied to the element is between about 20 and 60 psi.

89 (new): The method of claim 71 wherein said back-flush fluid includes gas and the pressure on the back-flush gas is controlled by a gas regulator so that the back-flush pressure is greater than the feed pressure on the element by between about 10 and 30 psi.

90 (new): The method of claim 71 wherein the back-flush fluid comprises cleaning solution in addition to permeate.

91 (new): The method of claim 71 wherein the back-flush fluid comprises permeate followed by compressed air.

92 (new): The method of claim 71 wherein said aqueous feed solution has a turbidity of at least about 50 NTU.

93 (new): The method of claim 92 wherein said element is completely submerged in said feed solution.

94 (new): A system for operating a spiral wound membrane element that includes the step of periodically back-flushing, which system comprises:

a feed tank holding a volume of feed solution;

a spiral wound membrane element having a permeate carrier sheet, a feed spacer sheet, and a membrane filter layer sheet, which element is aligned generally vertically within said feed tank,

means confining said spiral wound membrane to a generally cylindrical configuration with said element being open to axial flow at both ends thereof;

means for creating a vacuum in said permeate carrier sheet within said element to create driving pressure across said membrane sheet that results in permeate flow into said permeate carrier sheet and flow of feed solution upward into said element in said feed spacer sheet; and

means for periodically applying pressurized back-flush fluid to said permeate carrier sheet to back-flush the element by creating fluid flow from said permeate carrier sheet through said membrane sheet and into said feed spacer sheet.

95 (new): The system of claim 94 wherein a bubbler is disposed vertically below said element for creating bubbles which rise and promote convective flow of feed solution into the lower end, through the element and out of the upper end, said bubbles acting as turbulence promoters at the surface of the membrane filter layer sheet for reducing the boundary layer at the surface of the membrane filter layer sheet.

96 (new): The method of claim 94 wherein said aqueous feed solution has a turbidity of at least about 50 NTU.

97 (new): The method of claim 96 wherein said element is completely submerged in said feed solution.

98 (new): A system for operating a back-flushable spiral wound membrane cross flow filtration element comprising:

a spiral wound membrane cross flow filtration element;

means for supplying feed solution to the filtration element which includes a feed pump for pumping and pressurizing the feed solution and a feed pipe through which the pressurized feed solution flows to the element;

said element including a pressure tube having a first outlet through which a first portion of the feed solution which permeates the membrane exits as permeate, and a second outlet where a portion of the feed solution that does not permeate the membrane exits the element as concentrate;

a feed diverter valve for controlling flow in the feed pipe leading to the element to direct flow either to an inlet to the element or to drain;

a concentrate diverter valve for controlling flow of concentrate from second outlet of the pressure tube;

means for supplying back flushing fluid to the first outlet of the membrane filtration element to create reverse flow through the membrane; and

means for adjusting the feed and concentrate diverter valves during back flushing to allow the back flush fluid to exit through the feed pipe and flow to drain, and for adjusting said concentrate diverter valve to halt the flow of concentrate out of the second outlet of the pressure tube.

99 (new): The system of claim 98 wherein the spiral wound cross flow filtration element is oriented vertically and wherein the feed pipe enters the pressure tube at the bottom thereof so that solids removed during back flushing are assisted by gravity in exiting through the bottom inlet.

100 (new): The system of claim 99 wherein said second outlet is at the top of the pressure tube and a conduit interconnects said diverter valves and wherein said adjusting means allows fluid to be delivered through said diverter valves into the second outlet at the top to flow down through the element during back flushing.